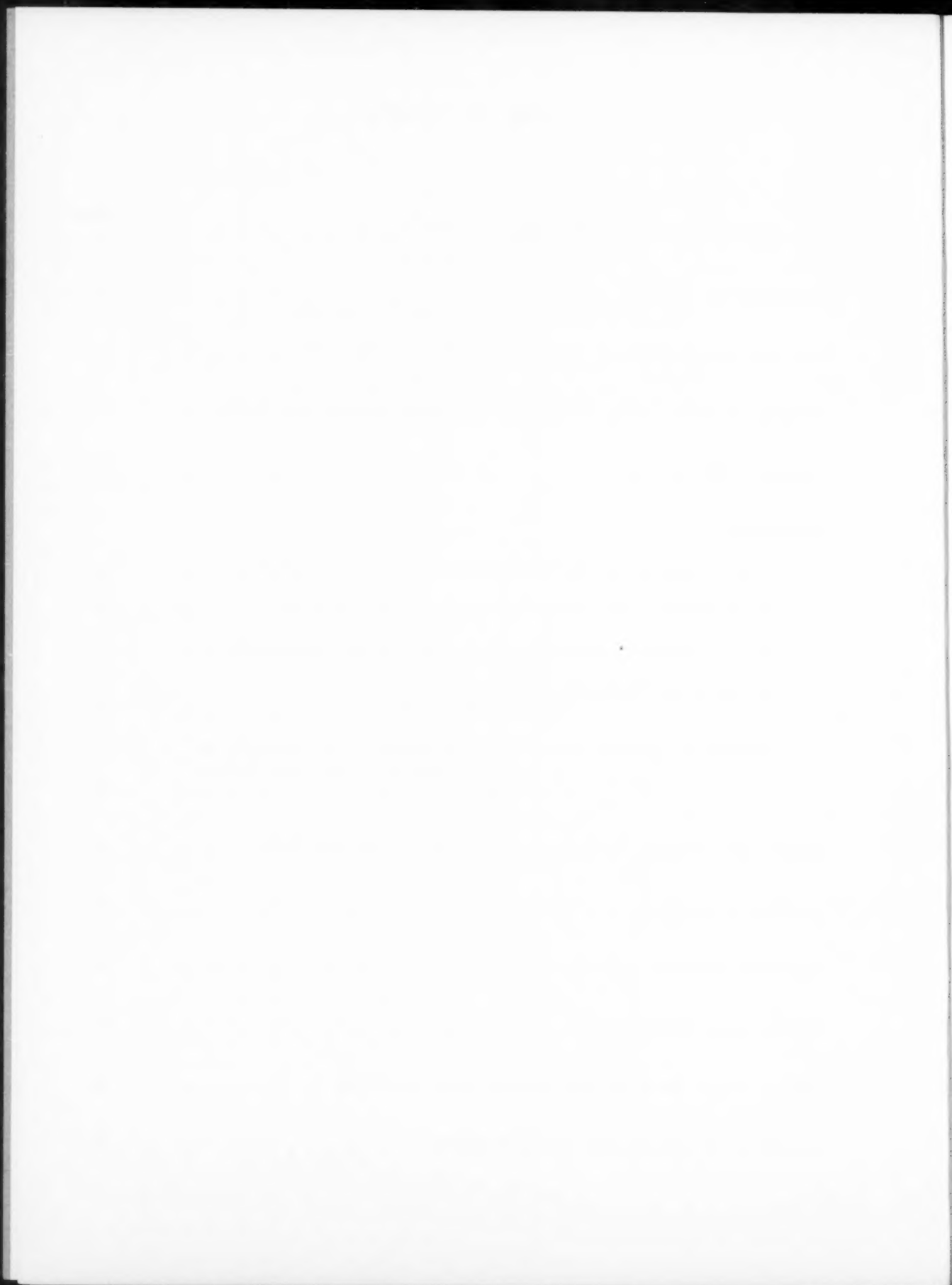


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## PROGRAM

Date: Thursday, December 29, 1955

Place: Meetings are held on the campus of Columbia University, in the American Press Institute room on the main floor of the Journalism Building, southeast corner of 116th Street and Broadway.

Luncheon and Fellows Dinner: Men's Faculty Club, Columbia University,  
400 West 117th Street, New York, New York.

Program: 9:00 a.m. Management Before Frederick Taylor  
John E. Hoagland, Assistant Professor of Industrial  
Management, Michigan State University

10:30 a.m. The Chrysler Divisionalization Story  
Frank Brown, Organization Department,  
Chrysler Corporation

12:15 p.m. Luncheon

1:30 p.m. Quantitative Measures of Management  
Robert O. Ferguson, Methods Engineering Council

3:00 p.m. Training for Industrial Management at MIT  
Van Alan Clark, Associate Professor and  
Chairman of Curriculum Revision Committee,  
Massachusetts Institute of Technology

3:45 p.m. Preliminary Report of Columbia University Survey  
of the Teaching of Administration at Selected  
Universities  
Charles E. Summer, Research Associate of the  
Samuel Bronfman Chair, Graduate School of Business,  
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4:15 p.m. Business Meeting

6:00 p.m. Dinner of the Fellows of the Academy

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MANAGEMENT BEFORE FREDERICK TAYLOR<sup>1</sup>

by John H. Hoagland

This morning I would like to explore with you some of the historical backgrounds of management concepts. As students of management and members of the Academy of Management we are all probably interested in the truth and accuracy of management history. It may help us better understand today's problems and more accurately forecast our future.

You are familiar with the classical interpretations of management history. Some of you, as authors, and many as teachers have repeated the often told tale of management foundations being laid by Frederick W. Taylor at the end of the 19th century, with no significant work having been done prior to his time. The roster of management authors who have passed along this story reads like a management's Who's Who; and the story is so classic that it is unnecessary for me to repeat it here this morning. This paper will, however, critically examine some portions of the Taylor story, as well as some aspects of management before Frederick Taylor.

How original was Taylor's work? Was anyone studying management problems before his time? Were the few recognized earlier contributions to management literature small, impractical, isolated cases with no significant influence on later developments? Did management ideas really have a sudden beginning only after 1880—, or, has the development of management been evolutionary with a rich heritage extending for centuries into the past? These are a few of the questions to be covered by this paper.

As a point of departure, let us examine the background of what has become one of the most classic works in the field of management --- Taylor's science of shoveling. This study has been regarded by management historians as one of the early applications of the scientific method to management, and as one of the first steps in attempting to arrive at what constitutes a fair day's work. The impression given by Taylor, and by many others since his time, has been that no one studied such a thing as the art of shoveling before Frederick Taylor arrived on the scene.

Nothing could be further from the truth. The art of shoveling was written about and studied a number of times long before Taylor experimented with shoveling at the Bethlehem Steel Company, in the early 1890's.

To show how close some of these earlier writings were to Taylor's, the following is what Charles Babbage, in 1851, was already calling "a familiar illustration." 2

"Two men are making an excavation, removing the earth in the usual way with spades and wheelbarrows.

"One of these men Q, does more work than his companion P, and if an inquiry is made, why is this so? The usual reply would be that Q, is either stronger, more active, or more skillful than P.

"Now it is the third of these qualifications which is the most important, because if Q were inferior even both in strength and in activity, he might yet by means of his skill perform a greater quantity of work without fatigue.

"He might have ascertained that a given weight of earth raised at each shovelful, together with a certain number of shovelfuls per hour, would be more advantageous for his strength than any other combination.

"That a shovel of a certain weight, size, and form would fatigue him less than those of a different construction.

"That if its handle were two or three inches longer than he required, its additional weight would at the end of the day have been uselessly lifted many hundreds of times.

"That if each spadeful of earth were lifted but an inch or two above the barrow, beyond what was necessary, a still greater waste of force would arise."

Babbage concluded with the following:

"In order to have arrived at this degree of skill, Q must when a boy have been taught to examine separately the consequences of any defect or inconvenience in the parts of the tools that he was to use in after life, or in the modes of using them. If not so taught, he must have arrived at the same knowledge by a slower and more painful effort of his own reflections." <sup>3</sup>

You probably recognize a great similarity between the previous shoveling illustration and the work of Taylor. Some may feel that Taylor was not taught such things in earlier life, but was one of those who arrived at his ideas by "the slower and more painful effort of his own reflections." Some may agree with the noted management author who wrote, "There is no plagiarism in Taylor ..... His ideas were his own, wrung by sheer force of personal effort, energy and originality from the unsympathetic environment of the machine shops of the United States." <sup>4</sup>

I cannot agree with such conclusions. Taylor was influenced by earlier developments, and so were other early contributors to our 20th century management literature. Some of the lines of influence can be traced back for at least several centuries.

The science of shoveling, for instance, can be traced back over a century to the work of Charles Augustus Coulomb in 1781. These studies of Coulomb are related, in turn, to other earlier writings which appeared at least as early as those of De la Hire in 1699.

As an illustration of the type of work done as early as 1699, note that De la Hire described how a workman carrying loads up a stairway could increase his output fourfold by using a pulley and his own descending weight to accomplish the lifting. The system began with the workman loading one side of a single pulley, then climbing the stairs with no load and by getting on the opposite side of the pulley his own descending weight would raise the previously positioned load. The process could be repeated continuously with the result that one man, by this system, could do as much work in a day as four men carrying the same total weight on their backs.



Coulomb's earlier mentioned studies of 1781, in addition to dealing with the quantity of work done daily by men shoveling, were concerned with man's daily work while climbing a ramp or stairway -- with or without load; and similarly while using wheelbarrows, levers, and while piledriving. These studies were widely known and frequently quoted. Unfortunately for the history of management concepts, this work is not known to have been translated from the French into English. If it had been, it might long ago have helped unmask Taylor's claim to great originality. Those interested in the history of a fair day's work should certainly examine this and other similar earlier studies.

Did Taylor know about such earlier writings? He certainly must have known of some of them. This conclusion is based not only on similarities in the examples of shoveling, but also on other similarities and additional evidence. For example, Taylor's pig iron handling work resembles earlier experiments on men climbing a ramp or stairway under load.

As another example of similarity, consider Taylor's so-called Law of Heavy Laboring. According to Taylor, the law was, "for each given pull or push of the man's arms it is possible for the workman to be under load for only a definite percentage of the day."<sup>5</sup> Taylor said he spent years in developing this law which was, to use his own words, "so simple in its nature that it is truly remarkable that it should not have been discovered and understood years before."<sup>6</sup> The evidence shows that many years earlier other writers had stated essentially the same conclusion. Coulomb, in 1781, wrote, "...men can, during several minutes' time, produce a quantity of action which they could not keep up an hour each day."<sup>7</sup> In 1822 another author similarly wrote -- "the first economic rule for the use of force of the man consists in dispensing it in a period of time long enough to permit frequent intervals of rest ... (when) a large portion of the muscles of a man's body are used ... it is necessary to give frequent intervals of rest..."<sup>8</sup>

Further evidence of Taylor's reliance on previous works is given by Taylor himself when he wrote the following with reference to heavy labor:

"Our first step was to employ a young college graduate to look up all that had been written on the subject in English, German, and French."<sup>9</sup>

If this is true, Taylor certainly must have known about some of these earlier writings and ideas.

To demonstrate how many writers were considering the work a man does in a day, or what was even then called a fair day's work, the following are some of those who wrote on this subject from the end of the seventeenth to the early part of the nineteenth century: De la Hire, Bernoulli, Desaguliers, Coulomb, Robinson, Buchanan, Gerstner, Welcher, Nordwall, Christian, Nicholson, Emerson, Leslie, Hachette, Morisot, Hassenfratz, Navier, Amontons, Euler, Schulze, Sauveur, and many others. Not only did these men study and experiment with the amount of work men could be expected to do in a day but many of these writers intended their results to be useful to industry, as indicated by their writings. There was considerable interrelation between the works of many of the above writers, and their results appeared in many publications in Europe during the eighteenth and nineteenth centuries. Many of these earlier observations and conclusions are still true today.

For the benefit of others who might be interested in reviewing any of these or other earlier writers I suggest that the material be looked for under appropriate headings or titles. Too many of our bibliographers and students of management have looked only for information under such titles as "efficiency" or "scientific management". Finding very little under these subjects before certain dates, they concluded that these ideas were entirely new. If material under topics such as "commercial organization", "animal strength", "prime movers", "Industrial mechanics", or other titles, had been searched, the opposite conclusion could have been proved. Drury, for example, in 1915 wrote A History and Criticism of Scientific Management which was supposed to have "statistically proved" the revolutionary growth of scientific management after 1910. Actually all Drury proved was the increased use of the terms "efficiency" and "scientific management" in titles. His entire study was based on a completely falacious assumption, and his conclusions were definitely wrong regarding a revolutionary growth of completely new concepts.

Further evidence of the non-originality of Taylor is provided by the Stevens Institute of Technology where, you may remember, Taylor did some study, receiving his Mechanical Engineering degree there in 1883. At that time one of the most prominent professors at Stevens Institute was Dr. Robert Henry Thurston, founder of the American Society of Mechanical Engineers and an internationally famous scientist until his death in 1903. Among the approximately twenty-two books and 670 articles and reviews which Dr. Thurston produced, as well as what was taught at Stevens Institute, there is definite reference to some of the earlier studies mentioned in this paper, as well as many other ideas which became part of Taylor's writings.

Taylor has been given the credit of being the first to "apply the scientific method to the problems of business management".<sup>10</sup> He does not deserve this credit for note what Stevens Institute was teaching even when Taylor received his degree there in 1883.--- They were teaching "The application of Scientific knowledge to familiar work and matters of business."<sup>11</sup> Stevens Institute was also teaching at that time such subjects as machine shop practice, precise measurements (including the use of the stop watch), machine design, tools, costs, planning, prime movers, and a "general resume of principles of business which must be familiar to the practicing engineer."<sup>12</sup>

It is impossible to say exactly how much influence men like Dr. Thurston had on Taylor, but it must have been considerable. Thurston himself wrote on such subjects as the following: business principles, economics in manufacture, economics in engineering, engineering education, industrial economics, scientific method, and many others.

The following from Dr. Thurston's President's Inaugural address before the American Society of Mechanical Engineers in 1880 gives some ideas of the views to which Taylor must have been exposed:

"The first step in any such work is the careful collection of facts and the patient study of all phenomena involved, and the registry of such facts and phenomena in the most accurate possible manner, and so systematically and completely that they shall be readily and conveniently available, and in such shape that their values and their mutual relations shall be most easily detected and quantitatively measured.



"In this work we need the aid of careful and precisely directed observation..."<sup>13</sup> Thus spoke one of Taylor's professors.

Even Taylor's work in the art of cutting metal is related to his studies at the Stevens Institute, for Taylor's work with the tire boring mill was part of his graduation thesis. There were many studies of tooling, belting, coolants, and similar subjects long before Taylor.

In the latter part of his career Taylor once said, "Hardly a single piece of original work was done by us in Scientific Management."<sup>14</sup> While this is undoubtedly true, it is diametrically opposed to the attitude Taylor almost always took in his writings and other activities. Furthermore, Taylor's followers and promoters have continually professed great originality in his work. The result has been that for half a century gross errors have been made in the presentation of management's history.

A former editor of the American Machinist wrote, "Taylor was extremely egotistical and frequently vindictive. He craved personal credit and admiration to an extreme degree."<sup>15</sup> Taylor is further known to have been one who would distort the truth to his own advantage, as he did in his testimony before the Special House Committee Investigating the Taylor and Other Systems of Shop Management.

Taking all this into consideration, it is time Taylor's position in management be more correctly stated.

This paper makes no claim of being the first to cry out against the Taylor mythology, for even in Taylor's time there were cries of protest.

There is still other evidence which could help dispel the Taylor myth, but time does not permit its presentation now. Unfortunately for historical research, many of Taylor's records and books were destroyed following the death of Mrs. Taylor a few years ago. What remains of Taylor's library and papers can be found in the library of the Stevens Institute of Technology. Fragmentary as this material is, it helps to explain some of Taylor's methods of operating and promoting.

The following, I believe, are valid conclusions regarding Taylor's position in management history: there was very little that was original in Taylor's work; many persons studied management problems long before he did; management ideas did not have a sudden beginning only after 1880; the development of management had been evolutionary with centuries of rich heritage; and instead of advancing the study of management, Taylor and his followers have retarded its progress by giving a distorted picture of its true development.

So much for Frederick Taylor -- let's now look at some other parts of our management heritage.

One earlier management writer, Charles Babbage, was such an unusual character that his life itself is an interesting topic for discussion, but time does not permit covering any of that this morning.

The majority of Babbage's ideas on management appeared in his outstanding book of 1832, On the Economy of Machinery and Manufactures. In this book

Babbage frequently gave remarkable clarity to some of the best management ideas which had been evolved by the early part of the nineteenth century.

Lest anyone fear that this paper is going to turn into a hymn of praise of Charles Babbage, let me hasten to point out that an extensive study of Babbage and his works has been made. It was found that although Babbage definitely contributed to the development of management literature, most of his contributions were based on previous works. Babbage's work was definitely not an isolated case far ahead of his time, as frequently has been believed by management historians, but he was truly a product of his time. As will be explained shortly, it is also known that Babbage had an influence on the development of twentieth century management.

The management ideas expressed in Babbage's works are too good and too many to receive adequate treatment in this paper. They covered such subjects as the importance of tools, machines, and mass production; the importance of the division of labor, both mental and physical; a basic marginal productivity theory; factors of plant location; reasons for large factories; profit sharing; unions; a fair day's wage for a fair day's work; calculating machines operated by punch cards; tool design, including the study of tool angles; observing and timing of operations; and many other topics.

As has already been pointed out, most of the ideas expressed by Babbage were gathered from other sources. They came from such areas as natural philosophy, mechanics, economics, statistics, the physical sciences, House of Commons Committee Reports, scientific journals, popular magazines, and many other sources including Babbage's own intimate knowledge of business and industry.

Babbage had an influence on the development of twentieth century management through various channels. Some were through his effect on such men as John Stuart Mill, William Stanley Jevons, Joseph Whitworth, Lardner and many others whose ideas were important to the background of this century.

The most surprising channel is the great influence Babbage had on Frank Gilbreth. As proof that this occurred may I refer you to the person who is probably the best possible source on this subject, the wonderful "first lady of management", Lillian Moller Gilbreth. Mrs. Gilbreth has made at least some of those who influenced Frank Gilbreth a matter of public record. Her notation of Charles Babbage having had a great influence on Frank Gilbreth is in the Gilbreth Collection at Purdue University.

Many ideas expressed by Babbage and Frank Gilbreth are quite similar. One of the most surprising similarities is in relation to the Gilbreth therbligs. Babbage's limitedly circulated paper of 1851, Laws of Mechanical Notation (for Consideration) contains ideas and symbols which seem closely related to some of Gilbreth's therblig ideas and symbols. Probably Frank Gilbreth applied to human movements ideas which he knew Babbage had applied to machine movements.

This and many other areas are still relatively unexplored in the history of management. There are many possible sources of information and ideas about our true heritage for we have been influenced by many people in a great variety of ways.

To show the great breadth of our background it should be noted that many of the ideas we have been discussing here this morning were taught in many schools and classes in Europe during the eighteenth and nineteenth centuries.

Some of these schools, like a German Polytechnique school founded in 1801, were established for "the education of directors, and persons employed in the management of public works ... (and) to contribute by means of scientific instruction to improve the national manufactures, and other branches of industry."<sup>16</sup>

In England, an industrial education movement spread during the early nineteenth century until by 1850, over 100,000 persons are known to have been participants in it. The purpose of much of this movement was similar to the following:

"It is not intended to teach the trade of the Machine Maker, the Dyer, the Carpenter, the Mason, or any other Practical business, but there is no art which does not depend, more or less on scientific principles, and to search what these are, and to point out their practical application, will form the chief object of this Institution." <sup>17</sup>

In France, Baron Charles Dupin started industrial education classes in Paris in 1824. By 1826 his work is known to have been taught in 98 French cities to over 5,000 factory workers, foremen, and supervisors. If you think some of these earlier men weren't teaching management concepts, listen to a few illustrations taken from Baron Dupin's lectures. (The following is a reasonably close translation from the French.) <sup>18</sup>

"When a worker is given a task which consists of continuous repetition of the same movement, he soon develops movements which are of a constant time duration."

Another illustration:

"For some men there is a strength of voice, appearance and posture, which commands for him in his profession, an esteem which can not be lightly contested. There is a noble simplicity which is fitting the industrial head, which will always earn him a place which he has a right to obtain in the ranks of society.

"There is another tone (of voice) which is fitting to the foreman, which will cause him to be obeyed, respected and beloved by his workers. In France, we often see foremen in workshops or factories who become too familiar with their inferiors, and who make them listen to long uncalled for speeches, and useless explanations which have no real meaning. We also see them pass from an indecent familiarity to the outburst of injurious anger, to be carried away without reason, and to make the whole establishment resound with their cries, for motives that are quite often frivolous. Precise, brief, simple orders, that is fitting in every case to a reasonable and logical authority; explanations which are always clear, heard as often as necessary, and never more than that."

A further illustration:

"It is of great importance for the foreman or director of the factory, whatever type it is, to produce each job with the least outlay of money. Thus, it is necessary for him to understand well the means by which he can, in any

circumstance, produce the desired effect with a minimum of energy."

Another illustration from Dupin:

"The improvement of industry increases the number of professions in which it is necessary to make a greater use of the intellectual faculties and a lesser use of physical energy."

Also from Dupin:

"Almost always, with a bit of observation and talent, it will be found possible to modify the posture required of the worker, so that they may have a comfortable position for their work. It is certain that this comfort itself will permit them to produce a greater useful effect. Thus, while appearing to be giving attention to the welfare of the workers, the foreman or the factory head will have worked for himself while serving humanity."

Dupin further wrote:

"It is of great importance that the head of establishments of industry encourage, in any way in their power, a type of community chest where the workers would place each day a portion of their wage, to underwrite their needs in case of illness and when there would be a lay-off from work and when age rendered them incapable of working."

On machine speeds he wrote:

"It is of great importance that we study with care for each type of industry, the different degrees of speed which are most fitting to each mechanical operation. These precise results of practice ... should be published in a compilation."

A last example from Dupin:

"It is a precious art in foremen and manufacturers to know how to break a job into its simplest elements, and nevertheless to keep them as small a number as possible, to assign each part to separate workers. This advantage may be pushed much farther in large establishments than in small ones, because there are more workers to be separated into distinct working rooms. When such a division of work is put into operation the most scrupulous attention must be exercised to calculate the duration of each type of operation, in order to proportion the work to the particular number of workers that are assigned to it."

This was from the work of Baron Dupin in 1826. Still further illustrations could be given from his works of many others, to illustrate management concepts of a century or two ago. I hope, however, that this paper has already covered enough information to point out how management has truly a rich heritage, much of which is still unrecognized.

The profession of management is an honorable one; let's give it the honest history it deserves.



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## THE CHRYSLER DIVISIONALIZATION STORY

By F. H. Brown

I bring you greetings from Chrysler Corporation. As a company, we feel distinctly honored by your Program Chairman's invitation to take a small part in your annual meeting.

The general theme for our discussion is "The Chrysler Divisionalization Story."

Divisionalization, as we call it, or decentralization of operating responsibilities results, of course, from the application of an age old organization principle -- that of downward delegation of decision making to a point near the scene of action. In both theory and in practice, decentralization has important obvious advantages. We do not need to dwell on them.

The real question, however, the \$64,000 question (or perhaps the \$64,000,000 question to some of us) is how, in actual practice, can we gain the advantages of decentralization and still provide for adequate central direction and control, -- all keyed to the attainment of the economic and social objectives of the company?

In recent years, this subject of management decentralization has been receiving a great deal of attention across the country. You are familiar, of course, with the strong and perhaps accelerating trend in both government and industry toward decentralization of operating responsibilities. It is of particular and timely interest to Chrysler Corporation. We have had to deal with its problems almost every day. You have probably read some of the magazine and newspaper articles on our "divisionalization" or decentralization program. It is possible that Professor Moore had this in mind when he asked us to participate today.

Before we really get under way, I should like to make one point clear. We do not pose as experts. Historically, Chrysler has had highly centralized management of its operations. It is only recently that we have taken consequential steps toward decentralization. True, in the last few years, we have devoted a great deal of study to the problems. We have also worked out and put into effect a number of important organization changes, all toward our objective of decentralizing operating responsibilities. However, in many respects we are distinctly inexperienced as a corporation at successfully managing what we now view as decentralized operations.

Just because at the moment we are more than fifty miles away from home (and I understand this is one criterion of an expert), or because we have been working at the job rather intensively, we do not expect, at this juncture, to add to the sum total of industrial organization knowledge. At the moment, we may be much more eager than many to learn and experiment in this field, but we are humbled by many unsolved problems and by the scope of the job yet ahead of us.

In preparing for this morning, I concluded that neither your officers, nor you as individuals, would expect or want an academic dissertation. It has assumed that you would most likely be interested in using Chrysler Corporation's experience as a sort of case study. I will intentionally paint with a rather broad brush. By this means I believe we can best set up the background for questions and discussion on the specific parts of our case study which may be of interest to you.

We will probably have half to three-quarters of an hour free to exchange ideas on the problems inherent in the type of changes we are struggling with at Chrysler.

In telling you about Chrysler I expect to first sketch out a bit about our company, some of the changes in management organization philosophy, and define exactly what we mean by our "divisionalization program."

Second, I will briefly summarize what we consider to be the fundamental elements of the management process.

Third, and finally, I plan to quickly review Chrysler's approach to the all-important first step in the management process, which we think provides one of the primary keys to successful management of decentralized operations.

First then, the background picture. In 1925, Chrysler had one line of automobiles, four plants, ten thousand employees and five thousand stockholders. Today, we produce and see five lines of passenger cars, Dodge trucks, parts and accessories, Airtemp air conditioning and heating equipment, marine and industrial engines, Oilite bearings and powdered metal parts, Cycleweld adhesives, and defense items ranging from tanks to guided missile parts. In further contrast to 1925, we now have 52 plants in the United States and Canada, as well as plants in England, Belgium, and Australia. Number of employees in United States operations currently total about 176,000 compared with the 10,000 thirty years ago. We now have 90,000 shareholders of record, about 10,000 dealers and we buy parts and materials from approximately 12,000 suppliers. At September 30, 1955, assets totaled \$1,200,000,000, and the shareholders' investment, represented by common stock and net earnings retained for use in the business, amounted to \$637,000,000. Sales volume for the nine months ended September 30, amounted to two and one-half billion. That's quite a contrast.

With this change in size and scope of Chrysler's operations, it is readily apparent to you that the same management organization philosophy and structure could not be effective in both 1925 and 1955.

In the early years, we had a highly centralized management. Literally, four or five key men in the central office made all important decisions. The heads of our automobile divisions, by today's standards, had relatively little responsibility and authority. The car was designed and completely engineered for them by a central Engineering Staff. The vehicle division heads' jobs were to assemble the automobiles that were designed for them, and to manufacture such parts and assemblies as were assigned to the particular plants under their administration. These division heads (Presidents, we call them) also had to sell the cars they assembled, but all important manufacturing and sales decisions were made by central management.



As an example of some of the problems in our old system, you will be surprised to know that the President of our Plymouth Division, until a very few years ago, was not entitled to information on the total cost of the Plymouth automobile. Here I am using Plymouth only as an example, because the same situation applied to most other operating divisions. This was not as capricious or as arbitrary as it sounds. The fact was that the President of the Plymouth Division had authority and responsibility for only 10% to 15% of the cost of the Plymouth car, and he was entitled to all cost information on that 10% to 15% for which he was responsible. Somewhat over 70% of the cost of the Plymouth car was purchased cost. The head of our Purchasing Department, who reported directly to central management, was, of course, entitled to all the information he needed to reduce the cost of these purchased materials and parts. In a like manner divisions supplying parts to Plymouth were entitled to complete information on the costs for which they were responsible.

Responsibility for costs incurred was adequately identified with the individual units of the company. The key point, however, is that the responsibility for profits, the net result of revenue and costs, resided in top central management only. We could and did determine profitability on a corporate-wide basis of each line of cars and the models and body types in each line. However, the responsibility for obtaining revenues and for control of costs of individual parts and assemblies was widely spread throughout different operations in the company, and there was no competitive measure of the profitability of the individual operations.

Under this highly centralized form of organization, Chrysler started, and it grew and flourished through the years. In terms of industry position, its greatest growth was during the 30's, including the depression years. Over most of the years of its existence, Chrysler has been an unusually good profit maker, and, of course, that's the primary reason we are in business, -- to make money.

By the late 30's, Chrysler had become one of the really large corporations in the country, and Chrysler management began to realize that some way had to be found of pushing down and spreading out decision-making.

During the World War II, the management took the logical steps of deciding that our airplane engine business in Chicago, our tank business in Centerline, Michigan, and our ammunition business in Evansville, Indiana, should be set up pretty much as independent entities. You may know that Mr. Colbert, now our president, was general manager of the Aircraft Engine Division in Chicago. These three divisions to a great degree had their own engineering, purchasing, traffic, accounting and other activities. They were operated pretty much as separate businesses. All three were highly successful ventures, and provided us with actual experience in some of the advantages and disadvantages of divisional management as compared with centralized management.

Shortly after the war, a similar almost complete separation was made of our Airtemp Division at Dayton. At the same time, efforts were made to center in other operating division heads more authority and responsibility than they had had before. Chrysler Corporation's operations were simply becoming too big, too diversified and complex to permit effective management by just a few people in the general office. As the company had grown, the load on these few people having authority in central management became increasingly heavy.

It became obvious that the only solution was to delegate increased authority to division presidents, and to make available to them costs and all the other kinds of information they needed in order to manage their divisions as semi-independent businesses. It also became clear that management could not make a substantial delegation of broad authority to the divisions without a complete change in Chrysler's accounting system. This was necessary to permit accountability for overall profits of individual divisions. The corollary requirement was to provide a real incentive to the division head on those parts and assemblies which his division made for others in the Corporation. Under the old system, transfers of these components were made on a cost basis, which meant that the manufacturing divisions made no profit, as such, on these transactions.

Consequently, after the end of World War II, the Accounting Department began to study what would be necessary to provide both information and profit incentive at division levels. They set up a task force to lay out in detail the changes that would have to be made in the Chrysler financial system.

One of the first results of these studies was put into effect on January 1, 1954, when transfers of materials between divisions were placed on a mark-up, or a profit basis. The rates of make-up used then were necessarily arbitrary, because Accounting had a big job in establishing, almost over night, transfer prices on many, many thousands of different parts. The intent was to get the system working with arbitrary transfer prices while the divisions became equipped with staffs of people competent to develop and negotiate competitive selling prices between divisions. This is an accomplished fact today.

I should like to underscore the importance of this change in our financial system, because accountability for profits and competition between divisions are the key factors in our approach to decentralization. Actually this scheme of selling parts between divisions at competitive prices is now new in American industry. In fact, it is used by almost all large manufacturing organizations having many plants and divisions.

With this basic change in the system made, it then became possible to set up books at division levels, appoint divisional comptrollers, divisional pricing staffs, etc. This has been done.

Then, in order to fit into our philosophy of divisional responsibility, it became necessary to study other highly centralized functions in the Corporation. We had to determine what, if anything, should be done to them.

These circumstances then led to a top management decision to accelerate the process of downward delegation and realignment of responsibilities.

This decision to intensify our organization efforts was first publicly announced on February 11, 1954, in Mr. Keller's and Mr. Colbert's message to stockholders accompanying our 1953 Annual Report. This activity became known as the "Divisionalization Program," and the Organization Department of which I am a member was established in March, 1954 to see that the job was carried out.

I have used the term "Divisionalization" several times. It might be helpful to you at this point if I define what we at Chrysler mean by this expression.

To us, Divisionalization is a management philosophy of organization and operation. It contemplates continuation of central executive staff formulation of policies and plans affecting Chrysler as a whole, accompanied by the delegation of additional responsibilities and areas of authority to the division heads. Inherent in this philosophy are the principles of divisional financial responsibility and competition between divisions. Inter-division business is conducted at competitive prices (rather than standard costs), and the capital employed by each division is so identified. The result is greater latitude (and incentive) for the division head to exercise his judgment in the conduct of his business, all within the broad framework of policies and controls established by the central executive body. He also carries out his job with the technical advice and assistance of central staff specialists. To the division head, the price of independence is acceptance of substantially complete profit responsibility, with earnings measurable in relation to capital employed. His division constitutes a measurable segment of Chrysler Corporation and he is held accountable for the overall profit or loss results from sales achieved and costs incurred.

In reality, divisionalization (or decentralization) is a way of managing without reference to geographical dispersion of physical facilities. In practice, this concept is not operative in an absolute sense, but is partly a question of degree. For a particular company, practical circumstances will weigh heavily in determining the appropriate degree of decentralization. As I mentioned earlier, this is not a new or untried philosophy in American industry. For example, our two principle competitors, and such companies as General Electric, Sears Roebuck, duPont, and International Harvester are among those utilizing this management philosophy.

The foregoing comments are intended to give you a general picture of our transition from a centralized to a decentralized organization

Next, let's go beyond general philosophy of management. Let us examine what Chrysler considers to be the fundamental elements of the management process. For the moment, let's speak in terms of central management. At Chrysler, central management works as both ruler and servant, -- it is the ruler of the Corporation as a whole, and the servant of both top management and the operating divisions.

As ruler of the Corporation, central management plans, it organizes, guides performance, and appraises results. These are the four basic parts of the process of managing. Of course, leadership and the function of rewarding performance are inherent in the picture.

First, central management plans. By this, we mean it sets the fundamental objectives of the company. It plans the scope of business and future course of the company. It also approves the objectives and work plans of operating components. Such plans are both long and short-range and form the background for eventual approval of appropriations by central management.

Next, central management organizes -- it divides the company into various working components, assigning products, plants and organizational jurisdiction over the various functions.

Central management also places fully qualified personnel in charge of the organizational units, and takes action to insure a reserve of replacements.

Third, central management guides performance -- by this we mean it assists and coordinates or integrates performance of divisions. It also makes decisions reserved to central management in matters affecting several divisions and in matters incident to the operation of the Corporation as a whole.

Fourth, central management appraises results -- by this we mean it reviews the performance of divisions and measures this against predetermined standards. These standards are established in connection with the review and approval of division plans. The companion function to appraisal of performance lies in rewarding good performance and taking corrective action in cases of poor results.

To plan, organize, guide performance and appraise results, these then, are the basic functions performed by central management as the ruler of the Corporation.

As a servant of the divisions, central management provides staff services. It supplies assistance and advice in specialized functional areas, and to some extent exercises functional control.

At Chrysler, these central functional staffs which serve the divisions are grouped in the fields of engineering, manufacturing, marketing, finance and legal, personnel, public relations, organization and planning. The latter two, organization and forward planning, are grouped under the Vice President of Organization.

Before closing, I should like to spend a few minutes on the first step in the management process, and that is planning. I want to give you a quick picture of our approach to this at Chrysler where we call it "Forward Planning." Broadly speaking, to us this means stating Chrysler's goals and beginning now to do the things necessary to reach these goals. It means defining the role each part of the Corporation will play, and integrating these plans into a total corporate program.

To do this, we have evolved a formalized and very serious approach to forward planning. It has now become a continuous, corporate-wide process. It is one of the fundamental means by which we manage decentralized operations. It provides a basic device for defining corporate objectives and for each organizational unit to do a grass-roots job of planning for a minimum of five years ahead.

Each operating division is required to spell out a comprehensive forward plan. In these plans, the divisions must include their objectives with respect to products, sales, advertising, manufacturing, organization, personnel and other functions. In addition to objectives, the divisions are required to identify the specific work programs, projects and plans (tied to time tables) by which they expect to achieve their stated objectives.



All of this, of course, must be translated into financial data and summarized in terms of complete operating forecasts, and capital expenditure and expense budgets. These are formulated and formalized by each division in writing and with the aid of charts and graphs. During the plan-laying period, there is substantial participation by the various central staff counterparts.

Initial drafts are reviewed and the necessary coordination accomplished by a Forward Planning Committee supported by a staff group which reports to the Vice President - Organization.

Once approved, these detailed plans become the basis for appraisal of divisional performance. This is what we mean by "grass-roots" planning: the forward plans originate within the divisions and, in turn, serve as the yardstick by which divisional performance is finally measured.

One final point -- we have omitted mention of people, and concentrated our discussion on organizational considerations. We must and do recognize that no matter how well conceived the plan of operation may be, it takes exceptionally capable and well trained management people to make the business go. Although Chrysler places great emphasis upon engineering development of better and better products, it sets even more store by the growth and development of its people.

QUANTITATIVE APPROACHES TO MANAGEMENT

R. O. Ferguson

Flying by the seat of the pants can be a dangerous practice in a fast moving management jet age that requires and is demanding more precise planning, measurement, prediction, analysis and control.

Today more than ever, management needs the best information it can get for guiding business operations both present and future. The margin for management error is becoming smaller and costlier.

A number of mathematically based procedures -- some old and some new -- are supplying useful quantitative information to management that is enabling it to fly a surer, more accurate course.

The purpose of this paper is to discuss the way in which of several of these procedures are contributing to better management.

To set the stage for what is to follow, I would like to quote from the letter that your program chairman, Mr. Franklin G. Moore, sent to the president of our firm, Mr. H. B. Maynard, regarding our participation in your program.

----Your organization is known as one engaged in operations research, linear programming, and related techniques. So, we would like to hear from some of your men on these quantitative approaches to management.-----

My approach to the subject, therefore, will be from the standpoint of the procedures or techniques used to provide quantitative management information.

Taking this thought one step further, it is possible to discuss with you a number of techniques and measures touching on each one of them generally. Another way is to discuss one or two procedures and explore each of them fully in terms of their quantitative aspects. I prefer the latter course because we can see some of the problems and draw some conclusions because the lines are sharper and clearer.

Our position and point of view regarding operations research and the related techniques can be summed up quickly by saying that we believe that they represent the most important development to come to the management field since the days of Taylor. Our experience has been that the procedures and techniques of OR are contributing to better management in at least two ways.

1. They are making possible more effective management of a firm's resources including people, money, machines, material, and time. Information never available before is now at management's finger tips. In addition, alternative programs can be evaluated in terms of dollars and cents -- and other specific quantitative yardsticks.
2. They are adding to the effectiveness of the individual management man by providing him with information and the means for evaluating that reduce uncertainty and add to the accuracy of his decision making. In addition, it permits him to predict and consider in advance the effect of changes that he may be contemplating.

Some of the techniques that are providing quantitative information for management are as follows:

- |                               |                                  |
|-------------------------------|----------------------------------|
| 1. Linear Programming         | 5. Feedback and Servo Mechanisms |
| 2. Waiting Line Theory        | 6. Monte Carlo Methods           |
| 3. Inventory Mathematics      | 7. Game Theory                   |
| 4. Statistics and Probability | 8. Search Theory                 |

As you would expect, a number of these techniques are more fully developed than others and consequently have been applied with more results. I'd like to tell you of the way in which our organization is applying several of these procedures or techniques to provide management with information that enables them to manage more effectively and profitably.

In discussing each one of these procedures -- I've made the assumption that you are not interested in the method or the mathematics as such. But rather interested in the management problems and areas in which they can be used, how they provide information of a quantitative nature, some of the results, and the problems that these results created.

#### LINEAR PROGRAMMING:

Let's start with Linear Programming -- because of all of the procedures -- it has been the most widely used and applied; and as a consequence has accomplished the most results for management.

Very briefly, linear programming is an allocation technique. Basically, it allocates a limited amount of company resources among the demands that compete for the use of those resources. The resources are allocated according to some criterion such as lowest cost, most profit, greatest quantity, least time, highest utilization of equipment, and the like. For example, orders can be assigned to machine centers where there are alternate machines on which the orders can be run -- according to least time, greatest quantity, least cost, and the like.

In everyday language, linear programming is a procedure for calculating the best answer to a problem having many possible answers because of the variables, limitations, and conditions involved. It is a method for selecting a best choice where choice exists. It provides the best combination of the variables being considered in the problem.

#### SOME OF THE PROBLEMS LINEAR PROGRAMMING HAS SOLVED:

Linear Programming has been applied to a variety of practical problems and has proved to be a valuable aid in the difficult task of working out sound answers to many types of business problems. Its usefulness and value for solving management problems is based on a special way of organizing problem information and some new methods of analysis for solving the problem. These two features make it possible to consider and relate more information and facts about a business problem than the human mind can handle by the usual pencil and paper methods. This is its virtue and its weakness. The results have been excellent but too much emphasis has been placed on the mathematics which tend to be confusing to the average manager.

The extent to which Linear Programming can be useful and the areas to which it can be applied are limited only by the resourcefulness and ingenuity of those who apply it. We have used the procedure to provide management with factual answers to such problems as the following:

Determining the most profitable product mix to be obtained from existing facilities.

Determining which parts to make and which to buy to get maximum profits.

Establishing the best inventory strategies.

Exploring the value of proposed methods improvements.

Scheduling orders to machines for least cost consistent with delivery promises.

Establishing the best locations for warehouses to minimize shipping costs.

Establishing an equitable salary schedule.



Programming a tar plant chemical operation for most profit considering manufacturing and sales requirements.

Supplying a fluctuating sales demand at greatest profit considering a fixed level of employment and inventory accumulation.

Allocating production among several plants to maximize profits considering distribution as well as manufacturing costs.

We are going to examine briefly the last two on the list -- Stabilizing Production and Employment and Assigning Production Releases Among Several Plants.

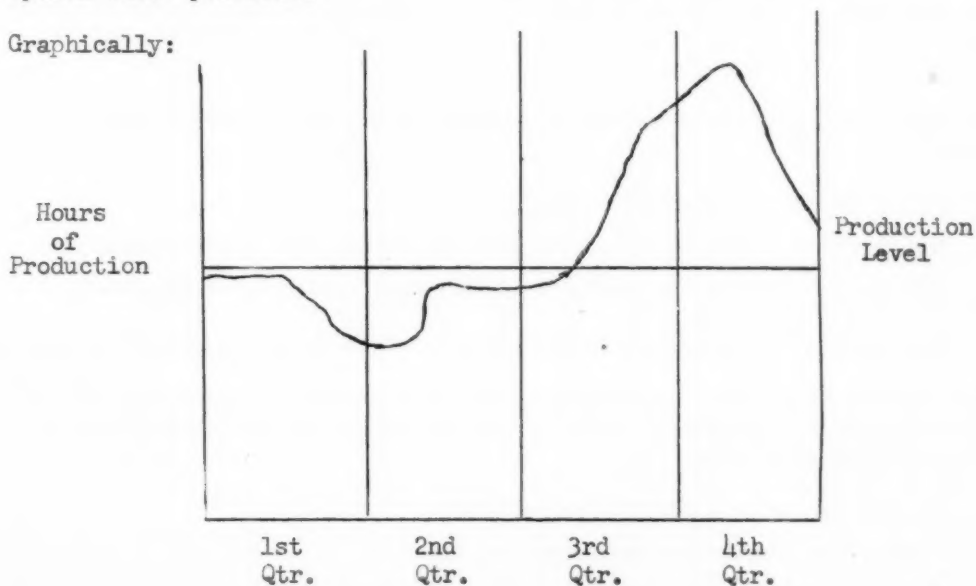
#### APPLICATION I

The company involved manufactures a semi-durable consumer product in one plant for national distribution to dealers. The problem that management wanted solved can be stated as follows:

Determine the least cost program that satisfies a fluctuating sales demand from a relatively fixed amount of plant capacity and level of employment, taking into account inventory accumulation costs and the option to make or buy.

The actual problem to be solved is to level or stabilize production load by relieving the overload of the peak period by filling in the slow period with a minimum penalty by making ahead and using the purchase-make option where possible.

Graphically:



As a place to start, the year is divided into quarters for programming. If desired, programs can be computed on a monthly basis.

The requirements for a part in any quarter may be satisfied in three ways:

1. Make the part in the quarter in which it is needed. For example, a part needed for the first quarter can be made in the first quarter.
2. Make the part in a previous quarter and carry it in inventory until needed. For example, a part needed in the second quarter can be made in the first and carried in inventory for a quarter.
3. Purchase the part as needed.

We want to know what program of production and procurement will maintain the desired level of load and employment at least cost. For each of the three ways of supplying a part the cost is different. The problem, then, is to plan the method of providing each part so that the total cost is a minimum.

After the objective is established and the necessary information obtained, it is set up and solved using the required mathematical manipulations.

An example of a minimum cost production program is given by the following table. (See next page)

The number of hours of production scheduled in each quarter for each part is shown by the encircled values. The number of hours purchased is shown in the last column by encircled values. Inspection of the table shows that quantities of Part I, III, V, and VI are made ahead. Part VI and VII are purchased.

The completed program provides management with the following specific information:

1. Which parts to make and which to buy.
2. Which parts to make ahead of schedule during the slack period.
3. The proper loading of machine groups that compete for manpower.
4. The cost of leveling or stabilizing production by inventory accumulation.

Much useful by-product information can be obtained by adjusting the data and recalculating the program. Some of the decisions for which supporting facts can be developed are:

1. Whether to obtain additional capacity.
2. Whether to change present manning plans.
3. How to take "hedges" on high or low forecast.

## MINIMUM COST PRODUCTION PROGRAM

Part	Qtr	Req'd.	First Qtr.			Second Qtr.			Third Qtr.			Fourth Qtr.			Purch.
			M-A	M-B	M-C	M-A	M-B	M-C	M-A	M-B	M-C	M-A	M-B	M-C	
I	1	200	(200)												
	2	400	(200)			(200)									
	3	600				(200)			(400)						
	4	700										(700)			
II	1	100	(100)												
	2	100				(100)									
	3	300							(300)						
	4	200										(200)			
III	1	200		(200)											
	2	200					(200)								
	3	200		(200)											
	4	400		(100)			(300)								
IV	1	300			(300)										
	2	600						(600)							
	3	900							(450)	(450)					
	4	1050										(500)	(550)		
V	1	50			(50)										
	2	50			(50)										
	3	150			(150)										
	4	100			(50)								(50)		
VI	1	300			(300)										
	2	300						(300)							
	3	300						(100)			(200)				
	4	600													(600)
VII	1	100			(100)										
	2	200													(200)
	3	300													(300)
	4	350													(350)
Idle Time			500			500			200		250	100		400	

Note: M = Machine Group

Two important general results emerged from this study.

1. The cost of leveling the shop load is proving to be much less than anticipated. Management is in a position to evaluate the program in terms of G.A.W. or supplemental unemployment compensation.
2. The uncertainty as to when to start accumulating inventory has been eliminated because a specific program that specifies timing is provided.

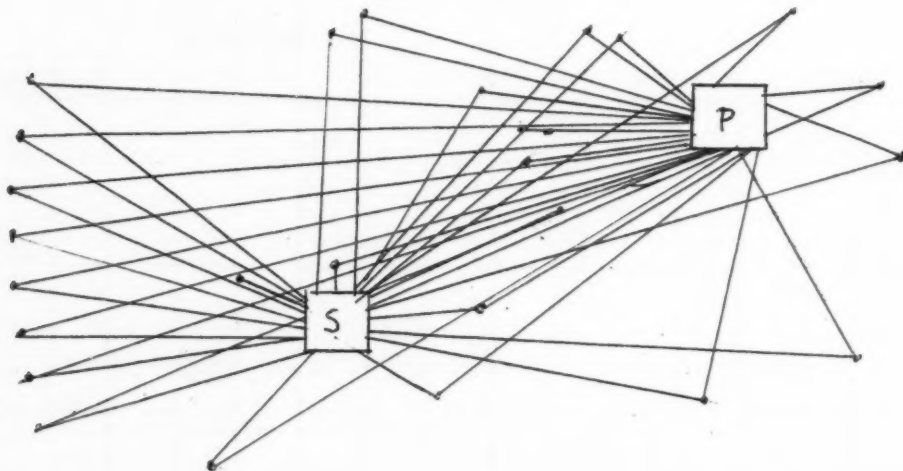
#### APPLICATION II

This company manufactures and supplies a variety of automobile products to a national market from two widely separated plants. Each plant is capable of producing most of the products.

The problem management wanted solved can be stated as follows:

What is the most profitable assignment of production released to the two plants that will meet customer demand considering distribution, as well as manufacturing costs.

Pictorially the problem can be shown as follows:



- S Manufacturing Plant at St. Louis - 7 Production Lines - 4 Different
- P Manufacturing Plant at Pittsburgh - 7 Production Lines - 5 Different
- 28 Shipping Destinations - Major Cities Coast-to-Coast - 6 Customers
- 32 styles of product made.

MOST PROFITABLE MANUFACTURING PROGRAM CONSIDERING BOTH  
MANUFACTURING AND DISTRIBUTION COSTS

Number of Standard Hours of Each Style to be Produced

Pro- duc- tion Line	Capa- city Std.Hrs.	1	2	3	4	5	6	7	8	9	10	Style Number	11	12	13	14	15	16	17	18	19	20
P1	3839.0					1870	1614	324.0	39.9	350.0			144.5	177.6	710	2013.7				33.6		33.9
S1	1348.2																929.9				418.3	
P2	1237.6	246								120								171.0				
P3	588.4				89																	
S2	1423.1		11.9	8.3							440.7						33.7		106.6			
S3	1273.3																					
S4	842.4																					
P4	182.2																					
S5	274.6																					
Total Demand		246	11.9	8.3	8.9	1870	1614	324.0	39.9	473.0	440.7		144.5	177.6	710	2013.7	963.6	171.0	1066	33.6	418.3	33.9

Profit = \$2,440,000 For Best Program

Profit = 2,320,000 For Program as run

\$ 120,000 Potential Improvement

A comparison of the proposed and computed programs shows that a potential improvement of \$120,000 for the quarter is obtainable.

These improvements are possible for the following reasons:

1. A better assignment of particular parts to the machines on which they can be run. Linear Programming methods made it possible to relate and weigh the various alternatives more effectively than the "usual method."
2. A better assignment of raw material within the two-plant system. This potential was overlooked because of the tendency to regard the two plants as separate entities rather than complementary parts of an integrated company system. The Linear Programming approach made it possible to look at the two plants as if they were two machines competing for the same material and products.
3. A more effective way of dealing with freight costs. Linear Programming showed that in some cases it was more profitable to produce certain parts in one plant--taking advantage of its higher efficiency -- and absorbing the freight costs to ship them to destinations located closer to the other plant.

Stripped of all the glamour and glitter, there are several common sense reasons why Linear Programming came up with the answers it did.

1. The procedure required that certain information be examined and set up in a way that hadn't been considered before. This was as valuable as the solution itself.
2. The procedure was able to "match or pair off" all of the costs simultaneously, one against the other until the best answer was reached. It was a better method.

In addition the Linear Programming calculations provide management with the following information.

- a. A definite program that specifies which orders are to be run on which machines in what amounts to satisfy customer demand.
- b. A basis for changing programs should changes in demand or interruption to production occur.
- c. Alternative programs of freight costs involving such factors as freight equalization in order to be competitive in distant markets, shared freight costs, and the like.



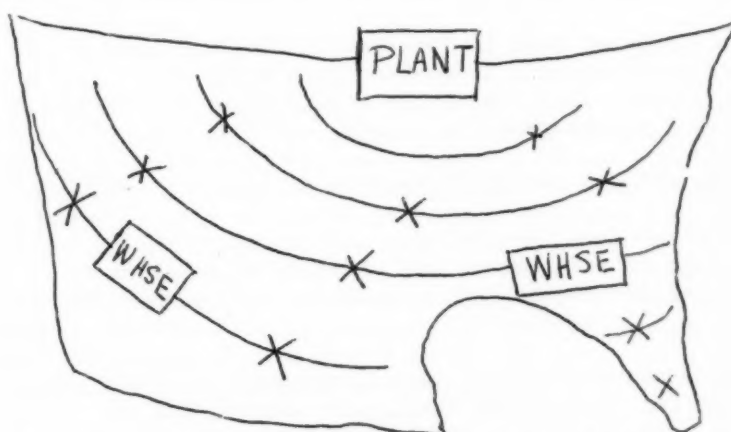
Furthermore, management is in a position to evaluate such decisions and policies as the following:

- a. What amount of profit is foregone and how much are costs increased when it is decided to operate one plant in a low production period at 50% of its capacity so as not to upset community and labor relations.
- b. What is the most economical location for a new plant, not only in terms of shipping costs of raw materials and finished products, but also in terms of effect on the assignment of orders to other plants.

### APPLICATION III

In this particular application of linear programming, the firm was in the position of being able to sell more of its products to a national market than it could make. The Problem was to make those products that would yield the highest over-all profit and buy the remainder.

The general procedure the firm had been using was to assign manufacturing capacity to the orders that could be shipped to nearby customers and buy in market areas farthest distance from the plant.



By taking advantage of the rate at which profit could be made on various products and using it to offset increased freight costs where they were involved -- linear programming methods provided a potential increase of \$350,000 profits per year over former methods. Tables were set up based on quarterly forecasts that indicated which products should be made and which bought. In short, management was provided specific information and programs on which to base profit planning.

#### APPLICATION PROBLEMS:

In spite of the fine information and programs provided management, a number of problems have presented themselves which have to be met head on. Some of these problems are as follows:

1. Quite frequently, managers become defensive when a comparison is made between their regular and linear programs. The difference -- much in favor of LP -- has been taken as a personal reflection on the ability of the manager to manage. This points to the fact that a selling job, in the best sense of the word, must be done when presenting results to management. Vice Presidents seem to pose a particular problem in this respect.
2. Much of the basic information required for programming is missing or only partially available. This requires time to obtain and put up in usable form. Fully 60% of our application time has been spent gathering information. At present, it appears that some revisions will be required in accounting procedures before the time for gathering data will be reduced.
3. There is a shortage of trained and qualified personnel for applying and carrying on programs once set up.
4. There is a great need to interpret, translate, and express in management terms the mathematics and technicalities involved in the application of programming techniques to management problems.

#### CONCLUSIONS ABOUT THE USE OF LINEAR PROGRAMMING:

1. In our experience, programming methods have enabled management to make better use of existing facilities. Each installation, without exception, has resulted in finding a "pot of gold."
2. This approach and insight into management problems provided the manager are making him more effective. This is especially true when evaluating alternatives quantitatively needs to be done.
3. Much business information that management has historically thought important, turns out in many cases to have little importance. Conversely, the importance and significance of other information is greater than management thought previously.

4. The techniques and methods, per se, are turning out to be of minor importance. The end, and people involved, are far more important than the means.
5. Management is not replaced but rather is supplied with better information as a basis for planning operations. Programming methods can supply the best information possible, but management still must do something about it to obtain results.

#### WAITING LINES:

We are just beginning to accomplish results with this procedure. We have been carrying out research in this area -- particularly in the textile industry -- because we see considerable potential for its use.

Our studies to date center around establishing the probability of looms going down for repair or going into the waiting line, and then establishing the number of maintenance men, weavers, and pick out hands that it pays to have to keep the looms operating.

We believe that waiting line theory will become increasingly more useful in the future. For example, the assignment of maintenance men to automated equipment is one promising area of application and there are many others.

We are definitely pointing our efforts in this direction and expect to translate existing technical material into useful application material for management's use.

#### INVENTORY MATHEMATICS:

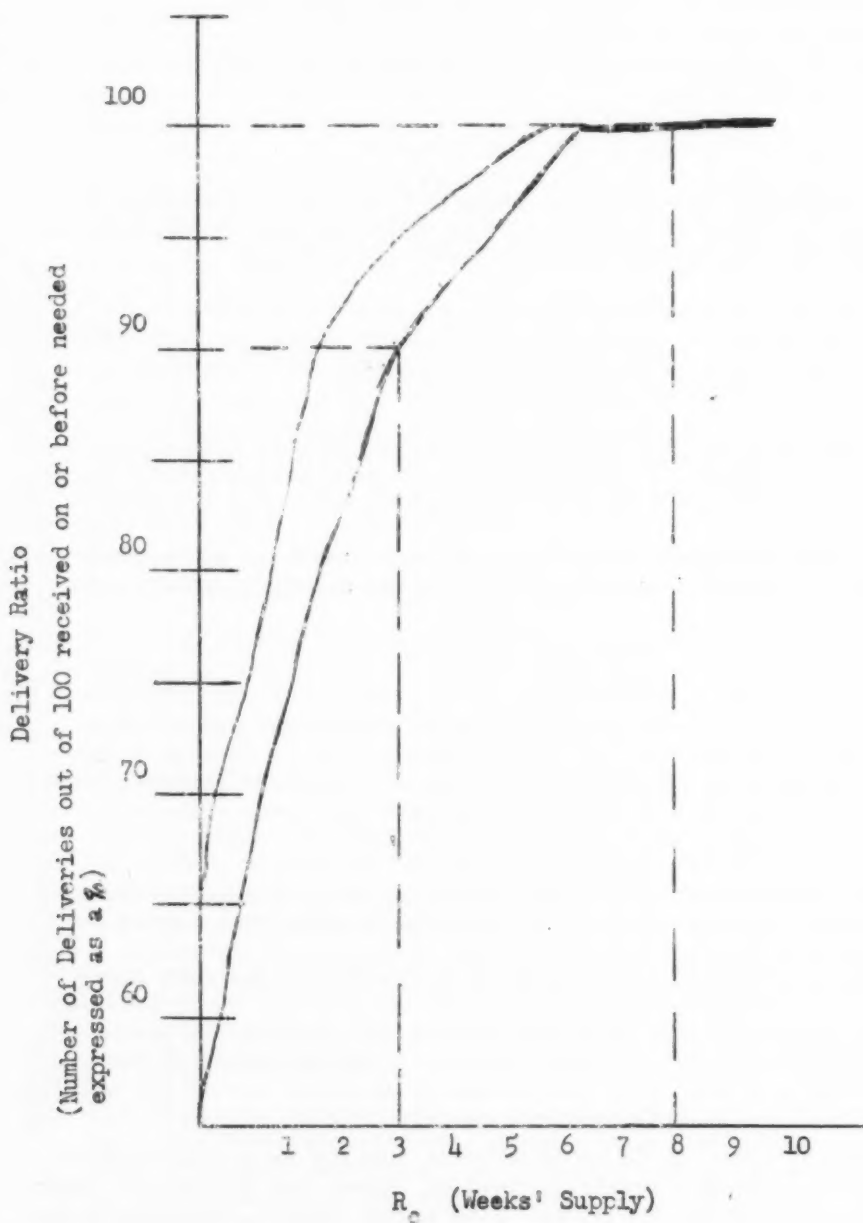
Much more is generally known about inventory than about linear programming and waiting line theory. We find, however, that a considerable potential for improvement is possible in the use of inventory reserves. An inventory reserve is a cushion or insurance to meet unforeseen changes in demand or delivery.

By obtaining information on the cost to carry, cost of stock outs, delivery performance, and the like, it is possible to establish tables or curves that enable management to evaluate some of its inventory policy. A typical curve for a group of parts is shown as follows: (see next page)

This diagram shows that the economic reserve to carry on the group of parts being considered in a three weeks' supply. This represents a 90% Delivery Ratio which means that 90 deliveries of material out of 100 will be received on or before the date they are needed.

Suppose, however, that the Sales Department insists on a 100% reserve. This will require eight weeks' supply instead of three, and of course, incur a higher cost. By costing the additional five weeks' supply, management can determine if the additional insurance or cushion is worth it. In short, management is provided quantitative information to help them make a decision. This same curve can be used to evaluate floor space.

The Effect on Inventory of the Relationship of Delivery  
Ratio and Reserve Component



## CONCLUSIONS:

The material and techniques presented today are a sample of what is being done to provide management with more accurate quantitative information.

Good results have been obtained and increases in profits, decreases in costs, and improved service have resulted. Perhaps the best way to summarize is to quote in part from a talk given by Mr. Robert Lewis, President of Argus Cameras, Inc., who had the following to say:

"The use of linear programming has provided us with some new applications of the principles involved. For example, in whether we buy or make given parts of a new product, we have replaced informal decisions -- usually made by the purchasing director and factory manager -- with objective analysis of piece price and tool cost. This has resulted in a basic economy which is extremely important in our new product area. It has given us more accurate new product planning and fewer 'wrong' decisions resulting in early production problems. We have also been assisted in the actual economical process to use: for example, whether a part should be a stamping or die casting. Another application we have found is in the annual determination of the standard cost of our products, in deciding whether the make cost or buy price should be the standard.

"Reviewing what we believe have been our accomplishments in linear programming for production control and inventory management, we feel specifically that we have reduced costs and increased control. In a more general sense, we are now making decisions objectively rather than flying by the seat of our pants. We also have more confidence in our ability to remain competitive because we know more about what we're doing.

"I think it might be appropriate to say at this point that the confidence engendered by use of these techniques enables the management to use greater vision in planning for the growth of the company. Decisions that historically have been made by management can now be made at a lower level. This gives our top people more time to devote to the many other problems that constantly present themselves. It is difficult to try to think in terms of growing unless you already have your present efforts under control.

"We find that new techniques such as linear programming and inventory management have given us additional means of expression. For example, we have often discussed the philosophy of inventory partitioning, but it took our efforts at formal inventory management to give us a way of expressing it. Our embracing of these techniques has substantially aided our communications. Our top management team joins the next lower level in advancing new techniques. The top management committee learns the trend of thinking of the lower level groups and is able to steer the thinking toward the solution of problems. In other words, the use of these techniques provides an excellent transfer of the philosophy of top management."



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## EDUCATION FOR INDUSTRIAL MANAGEMENT AT MIT

W. Van Alan Clark, Jr.

The purpose of this report is to present to you the results of a review of the undergraduate curriculum in Industrial Management at M.I.T. This review is presently at the stage of final committee report and discussion by the faculty of the School of Industrial Management. I should thus warn you that it represents a committee viewpoint rather than agreed-upon School policy at this time.

An educational program makes sense only in relation to the aims of the institution of which it is a part. The School of Industrial Management is a portion of the Massachusetts Institute of Technology, which is largely a university of science and technology. I may report my belief that M.I.T. strives for excellence in professional education, and belief that it has done well in the matter of combining humanities and cultural studies with professional courses in science, engineering, architecture, and management.

The School of Industrial Management, prior to its emergence as a School under the aegis of the Sloan Foundation in 1952, has existed since 1914 as a substantial undergraduate department. The big expansion since 1952 has been at the graduate and executive development level, although the graduate program has been in effect for many years and the Sloan Executive Development program was initiated in 1939. The undergraduate program in Business and Engineering Administration has operated at the level of about a ten per cent share in the M.I.T. undergraduate market, being over the years one of the four largest of some twenty undergraduate degree-granting groups at the Institute. The department has a tradition of placing its emphasis upon general line management rather than upon industrial engineering or management engineering. Largely through the leadership of Erwin Schell, great attention has been given to problems of top management or presidential thinking. The department has always adhered to a rigorous engineering curriculum, and although I am somewhat prejudiced, I hope that it is fair to state that the department has over the years avoided some of the problems inherent in being the principal non-technical major in an institution which is primarily devoted to technology.

At the time of the emergence of the Department of Business and Engineering Administration into the School of Industrial Management in 1952, the undergraduate program was a fairly orthodox arrangement of "functional" subjects: production (really a basic industrial management course along the Lansburgh and Spriegel line), marketing, accounting, personnel, finance, and business law. In 1952 an introductory sequence of two subjects was established for the purpose of providing a basis in business management and business policy. This sequence was felt not to be a success, principally because it did not result in market change in the design of the later courses or, in our opinion, of the student's performance in these courses.

Many things have happened since 1952, however, which taken together have served as an occasion for a thorough-going curriculum review:

1. The first of these occasions is the extensive enlargement of the School faculty. We have gone from a staff of 16 faculty members to approximately 40. We have brought to Cambridge men from business and economics departments from every part of the country.
2. We have finally begun to recognize the many things which have happened in the business education field since 1941. There have been several important break-throughs in the area of quantitative analysis of business problems. With and supporting this movement have been major developments in establishing the relevance of economics to business decisions. There have been many developments in the areas of sociology and the understanding of group behavior. There has emerged a whole new frontier in experimental social psychology. We have gained new respect for the uses of the historical method as it may apply to an understanding of business.
3. We are operating within an era of great searching in the fields of undergraduate scientific and technical teaching. Of especial note here is a rising awareness of the limitations of a four-year program. Of note also is the way in which the classic distinctions between science and engineering and between fields of engineering become obsolete as our new fields of technology mature. Thus "automation" spreads over science, many fields of engineering, management, and economics.
4. We have seen a considerable evolution in our M.I.T. undergraduate Industrial Management program within its basic framework. We have moved our required economics subject from the junior to the sophomore year. The two-term Introduction to Business Management sequence has been replaced by a one-term subject called Theory of the Firm and by a semester of Statistics. In conjunction with our Mathematics Department, we have a special mathematics subject which replaces differential equations in the second term of the sophomore year. This subject deals with probability and expected value and applies these concepts to business operations problems. These subjects now provide a basis for our regular series of subjects in production, accounting, marketing, personnel, and finance.
5. Finally, we are unable to avoid the conclusion that we have to some extent come to the end of our rope in the evolution of our functional subjects. The current research of our faculty members seems usually to cross functional boundaries. "Good" teaching in the functional fields is usually concerned with economic decisions, which leads to duplications. We thus felt the need for a new course arrangement.

Here are some of the questions we had to answer before beginning a review:

1. Is our unit of education an explicit or desired level of achievement or is it a unit of time?

Our answer is that we are interested in doing what we may in four years.

2. Do we view our program as being basically an engineering program with industrial management overtones? (The undergraduate program has always enjoyed accreditation by the Engineers' Council for Professional Development.)

Our answer is that we now believe that the management field has sufficient depth and discipline so that we view management as our profession and science and technology as a base.

3. Is industrial management, or any type of management for that matter, teachable or worth teaching at the undergraduate level? Some of us have for many years felt that the undergraduate student of today is not sufficiently mature or sufficiently knowledgeable about the world of affairs to be able to make any sense out of the management process.

We now believe that the fundamental disciplines of mathematics, economics, and social science are of such relevance to business that an undergraduate program can accomplish a degree of understanding which is worthwhile. We feel that this body of intellectual procedures can be taught effectively at the undergraduate level.

With these thoughts as a basis to our thinking, we constructed a statement of objectives. This tends to be a fairly stilted exercise. In this case, however, it served as a test against which to measure the proposals which came before us. Thus, it became refined and clarified to the point where I wish to present it to you here.

### Objectives

The purpose of Course XV is to develop men for leadership in industry. The course is based upon no specified career; rather it is based upon the belief that an education for any kind of industrial and business leadership is one which attempts to develop the following characteristics in its students:

- A. Analytical Orientation. The course should develop a professional approach to the solution of business problems and the making of executive decisions. This involves practice in logical thought, development of skill in quantitative analysis, understanding of how to find, interpret, and draw conclusions from empirical evidence, and willingness to experiment wisely. It also encourages the creation of new techniques of problem solution when these are needed. Most important, it involves the ability to relate appropriate theory to practical problems.
- B. Technological Understanding. The course should develop the student's understanding of science and technology. Competence in technology is not viewed as an end, but as a means for comprehending the processes of scientific inquiry, innovation, and technological application.

- C. Sense of Change. The course should develop the student's awareness of the institutions which underlie business and social activities, and of the processes by which they operate. The purpose here is to strengthen the student's willingness and desire to initiate change upon a sound basis of historical perspective.
- D. Understanding of People. The course should develop the student's understanding of people both as individuals and as members of a group. Ideally, he should have both an intellectual knowledge and emotional understanding of the motivations, ideals, and interactions of fellow humans.
- E. Initiative for Growth. The course should so develop the student's habits of work and stimulate his desire for knowledge that he will consciously and purposefully carry forward his education after graduation.

The program by which these purposes are to be achieved is not viewed as a liberal education or as a type of preparation for later work in some branch of science or technology. Rather, it is viewed as a basic training in the intellectual procedures and understandings which underlie wise business management. The program has a professional purpose and as such belongs in an institution which devotes itself to education with explicit career aims. And because it is a program which emphasizes important theories and principles of science, engineering, mathematics, economics, and social science, it constitutes a broad education for today's society.

May I make a few remarks about this statement:

1. We do not state, nor do we imply, that we are concerned with line management as contrasted to staff management training. We view the intellectual processes to be the same for any type of management activity and hope that our men may be leaders at all types of jobs during their careers.
2. We do not state that we expect our students to achieve an immediate competence in one or a range of the normal management fields, or in "management" as a field of its own. We view knowledge of these fields as being of less importance than the ability to detect and solve problems and to make and implement decisions.
3. We feel that an implication of the objectives is that the program should be sufficiently flexible so as to meet the needs of the individual students. The student must accept disadvantages of conflicts in schedules and we in turn must accept the hazard that a weak student may exploit the program. We view as more important the returns offered to the strong student which come from making it possible for him to obtain a program which is best for his purposes, and the value to all students which comes from assuming educational responsibility.



4. In our planning we have concerned ourselves only with the curricular aspects of the program. We wish to point out that the course work is only part of an educational program and that the relation of student to faculty, the classroom and office climate, and the moral and cultural tone of the environment are of equal or of even greater importance.
- - - - -

The program shown adheres to M.I.T.'s common first year. Starting in the second year we show a core program of ten subjects. Some of these core subjects we now teach and need little change other than evolutionary improvement; others are new.

Economics. This is the regular macro-economics subject offered by Department of Economics. There is reason to believe that this subject may be too easy in its present form for men motivated towards economics and business so that we may eventually request a stronger treatment.

Accounting. Since this becomes more of an introductory subject in the business sense than it has been, we would look for a shift in emphasis towards the meaning of accounting in the sense of describing entrepreneurship. Although the emphasis of this subject has never been accountancy as contrasted to the uses of accounting in management, we would favor an even further movement towards accounting in relation to managing an enterprise.

Theory of the Firm. This subject represents the School's opportunity to present a theory of the individual enterprise. With this subject preceded by economics and accounting there are great opportunities for experimentation, such as those of using more nearly raw data, and developing concepts of opportunity cost, sunk costs, and incremental costs in a fashion which combines economic theory with business data.

Management Literature. The aims of this subject are given as:

- A. To provide an acquaintanceship with the content and ideas in the literature of business and management.
- B. To provide practice in where to look for management information.
- C. To provide practice in effective assimilation and evaluation of written material.

The subject is envisioned as running on a one class per week basis. It is proposed at this time that each section would read one or perhaps several (by dividing into teams) books each week and that a short written report on several specific questions would provide the basis for the classroom discussion.

The committee has considered at some length the problems of teaching and logistics inherent in this subject and feels that the value of the course far outweighs the likely difficulties.

Statistics. The committee hopes that our productivity in teaching statistics may reach a level where the students have some real understanding of the logical basis for statistics as well as an understanding of theory and ability to carry out manipulations.

Managerial Analysis. This subject will deal largely with the quantitative approach to the solution of operational problems as well as some business design problems. It will be largely concerned with tools of analysis which may be grouped under the heading of total cost and revenue models, marginal models, uncertainty methods, programming methods, and experimental methods. It is expected that the problem areas can be generalized over the entire management field. Our experiences in similar courses make us feel that the objectives of this subject are realizable, especially on the base the new program will provide.

Industrial History. This subject is being designed to reveal some of the scientific, technological, economic, and social considerations that enter into modern business decisions, through an historical approach.

Human Behavior. This subject will be a study of the behavior of the individual in the light of his relations with other individuals, with the groups of which he is a member, and with his physical environment.

Business Policy Studies Sequence. The Committee recommends a required senior integrating two-term subject. This subject would have two continuing parts:

- A. A field analysis carried out by small groups of students of the operations, prospects and purposes of individual firms. In general these studies will follow the classic outline for a business analysis.
- B. Seminars, lectures, and problems in the field of organization, planning, control, and administration. The committee feels that we need a vehicle for bringing before our students some of our important local personalities and faculty members to discuss and evaluate with them important new business ideas and trends. Visitors to the School should also meet undergraduates through this subject.

Electives. The program shows a minimum of seven elective subjects in the last two years. Stronger students may take a sixth subject each term, making possible eleven electives. These electives may be in the traditional managerial fields. We expect them, however, as time goes by, to evolve more around the interests of the faculty rather than around a managerial specialty as it is now typically defined. We have men who are interested, for example, in data processing, and this may well become an elective. This subject will cut through accounting, cost accounting, production and inventory control, and parts of marketing. We have men who are interested in the development and management of improvement programs. This might be an elective. We have several faculty members who are interested in problems of forecasting and risk so that we may end up with an elective which cuts through areas of capital budgeting, marketing, finance, and parts of production.

Functional Subjects. It will be noticed that the committee does not show in the program a required series of subjects in the traditional functional fields of production, marketing, personnel, and finance. The committee feels that these subjects tend very much to resemble each other when they are well taught. We feel that the type of thinking involved in these areas, as well as an understanding of these areas, can better be provided by the "core" sequence provided in the sophomore and junior years. It is expected that students will elect subjects in marketing, production, and finance in their third and fourth years. It is expected that these courses may be much stronger than is now the case and that students taking a two-term sequence in any given field (which practice should be encouraged) may be operating at a fairly professional level.

Humanities Program. The humanities program at M.I.T. is designed to provide a general education for students in engineering and science. The proposed Industrial Management program includes as professional subjects economics, history, and other social science subjects which are usually considered humanities. Subjects in these areas are of course essential to us and to this extent engineering and science subjects become general education for our students. We recommend on these grounds that it is unnecessary for our students to fulfill the formal humanities requirements. We expect, however, that many of our students will elect subjects taught by the humanities faculty in economics, labor relations, history, and psychology, and that our use of subjects in these areas will increase. Students may, of course, elect subjects in literature and the arts.

Honors Program. The committee is in favor of some form of honors program. We have in effect for the spring term of 1956 a plan by which exceptional seniors work with members of the faculty on a tutorial or research assistantship basis. This program can be extended within the elective system we have proposed.

Science and Engineering Subjects. The committee proposes that students take at least two more subjects in science beyond those specifically required. These might be further physics or chemistry, or might be a two-semester excursion into a life or earth science as a broadening experience. The committee feels that four semesters in engineering as a minimum should be provided in a chosen engineering field. In some cases more than four semesters might be required to provide some understanding of the nature of technological application in that field.

Industry Field Study and Work Study Programs. The committee feels that the next and immediate frontier of the School is that of finding ways to couple our developing depth in theory with live industrial practice. We find growing company acceptance of intensive analytical work by students. We have found evidence of company willingness to accept work-study programs on a basis which is considerably more educational than simple employment. We feel that our current students need these types of experience badly. We feel that our current students need these types of experience badly. We feel that work in vivo is by almost every measure more desirable for undergraduate students than the use of embalmed case material. We are now studying this problem intensively.

CONCLUSIONS

May I review what our committee has said about an undergraduate program in Industrial Management at M.I.T.

1. We continue to offer an undergraduate program in industrial management which attempts in four years to prepare a man for a useful career.
2. We continue to base this program upon M.I.T.'s program of basic science and continue to lean upon basic technology as an important educational experience for our men.
3. We do not expect our men, however, to attain even a semi-professional technological competence.
4. We believe that there is now sufficient depth of basic intellectual procedure in industrial management so that the program now merits a required core based upon method rather than business functions.
5. We expect our advanced courses in the future to represent much more closely than is now the case the professional interests of the faculty rather than the orthodox management fields.
6. We view as our next problem that of balancing theoretical depth with live industrial practice.
7. We have attempted to define a program which gives room for and encourages evolution and educational experimentation on the part of the faculty. Perhaps one of the real tests of an educational program is whether it encourages faculty interest and provides a base for further modification and refinement.

## Appendix

## PROPOSED PROGRAM

Fall Term

Chemistry  
 Physics  
 Humanities  
 Calculus  
 Military Science

First YearSecond Year

Physics  
 Calculus  
  
 Humanities  
 Economics  
 Accounting  
 Military Science

Third Year

Statistics  
 Industrial History  
 Science  
 Engineering  
 Elective

Fourth Year

Business Policy Studies  
 Engineering  
 Elective  
 Elective  
 Elective

Spring Term

Chemistry  
 Physics  
 Humanities  
 Calculus  
 Military Science

Physics  
 Probability and  
     Operations  
     Analysis  
 Humanities  
 Theory of the  
     Firm  
 Management  
     Literature  
 Military Science

Managerial  
     Analysis  
 Human Behavior  
 Science  
 Engineering  
 Elective

Business Policy  
     Studies  
 Engineering  
 Thesis  
 Elective  
 Elective



PROGRESS REPORTTHE TEACHING OF ADMINISTRATION AT SELECTED UNIVERSITIES

(A research project of the Graduate School of Business, Columbia University. The project is sponsored by the Academy of Management, and funds for its execution are provided by the Samuel Bronfman Foundation.)

Charles E. Summer, Jr.

Many of those present here are already familiar with our project, "The Teaching of Administration at Selected Universities." It was submitted to and approved by the Academy's Research Committee last summer, and Academy members at several schools have been kind enough to let us impose on their time during the recent field trip.

We have not completed the interviewing in connection with the project -- there are five schools to be visited during January. Nor has there been sufficient time to analyze interview summaries and draw conclusions. For these reasons, it would be unwise at this time to try to present much in the way of substantive findings. I will therefore confine my remarks to a description of how the project originated, what its purposes are, and the work that has been accomplished to date.

I. HOW THE STUDY ORIGINATED

As is the case with many research studies, it is difficult to pinpoint just how this one originated. I believe Professor Mee's paper at last year's Academy meeting was a factor -- he discussed "The Place of Management in the University Curriculum." Then Professor Newman and I conducted a seminar here at Columbia last spring on the subject "The Goals of Executive Development." This centered on Executive Skills. These two things, plus the interest and support of the Research Committee of the Academy were probably the major factors which aroused our interest in the subject. The original proposal and plan was prepared early in the year.

II. THE PURPOSES OF THE STUDY

The central purpose of the study is to state the objectives of courses in administration, and the methods which are being used to achieve those objectives. In other words, we are seeking the answer to the questions, "If you give courses in administration, what is it that you are trying to develop in students to make them more effective managers or administrators?" and "How do you go about this?" Admittedly, this is a large order, and we were and are skeptical as to whether these broad questions can be successfully attacked. However, on the basis of interviews to date, we are cautiously optimistic about the results.

In order to more fully understand this central purpose, I might mention four qualifications pertaining to how the objectives and methods involved in administrative courses are to be stated in the project:

First, They should be stated in a concrete and meaningful form. People talk on various levels of generality about their objectives -- some say, "We are trying to develop administrative skill," others may say, "We hope to teach students how to get along with other people" and so on. These statements may be genuinely meaningful to one who makes them, but they are so general when communicated that others do not comprehend that meaning. So we devised a simple three-dimensional frame of reference, to state objectives in terms of knowledge, skills and attitudes, and are attempting to translate the objectives of individual professors into this frame in some detail.

Secondly, we will try to state objectives in a common language which can be understood from school to school. Such terms as "awareness," "sensitivity," "a way of thinking," a "philosophy," "wisdom in decision making" and others, sometimes mean different things to different people. These, we believe, can be more easily understood if translated into some common frame as mentioned above.

Third, we might be able to generalize objectives and methods on the basis of the practice at the different schools, to show areas of agreement and thus provide food for thought for any one school planning new offerings or improvement of existing courses. Whether or not we can generalize prevailing practice, at least we can point up significant differences of opinion.

Finally, we hope to disentangle the objectives of course in administration from the methods involved, in order that the former may be more fully understood. It seems difficult, particularly when discussing the "pure" case method, to do this. In the past, failure to separate objectives from methods involved may have obscured the real goals toward which individual courses are aiming.

### III. INFERENCE OF EXECUTIVE KNOWLEDGE, SKILLS AND ATTITUDES

I will turn now to a second way of looking at the purpose of our study, and this may be of some interest to the business world as well as to collegiate institutions. In a way, we will also be attempting to answer the questions, "Is there a body of knowledge, and are there skills and attitudes which make for effective administration?" and "If so, what is that body of knowledge, and what are the skills and attitudes?"

These questions, as we all know, have not been answered experimentally or empirically. There is some good information, but it is fragmentary. Further, much of the psychological research in this area has had to do with so-called "inherent traits," and not trainable characteristics. Neither has the question been answered by leaders in the business world, because there have not been enough businessmen with either a) sufficient experience, b) the inclination, c) the time, or d) the reflective mental nature necessary to approach these questions.

It seems reasonable therefore if we have a sample of leading thinkers in business schools across the nation, that their opinions might be as valid an answer to the question of executive characteristics as is available.

I hope that these brief remarks give you some idea as to what we are trying to accomplish. We might now summarize the work that has been done to date.

#### IV. A SUMMARY OF WHAT HAS BEEN ACCOMPLISHED TO DATE

I have just returned from a two and one-half month trip during which I visited sixteen universities and interviewed one hundred and three professors and fourteen deans. Each interview requires from one to three hours to complete, and an additional two hours to write a summary.

The translation of objectives into knowledge, skills and attitudes is being done at the course level, not because there is anything sacred about the arbitrary line drawn between courses, but because we found that if we talked about a group of courses together, this would require unnecessary time on the part of the professor to integrate objectives during the interview. Talking at the course level also enables us to be more detailed and specific regarding the three kinds of objectives.

#### Selection of Courses for Study

Those courses have been selected which seek to train people in administration, and which are not oriented to any specialized function (sales management, production management for instance) or to any particular institution (manufacturing company management, retail management, government administration). We view this group of courses as including these areas: (1) so-called policy and organization courses, (2) courses in human relations, (3) courses dealing with planning and control from the management viewpoint, whether they be quantitative or not, and (4) courses which deal with social responsibility.

While we have not defined "administration" or "management" precisely at this point, our selection of courses loosely infers such a definition. My guess is that even though we are not in the business of creating a conceptual framework for ourselves, we may be forced to draw up a minimum number of definitions in order to write the report.

For each interview (and therefore for each separate course) the interview report is divided into four sections. The first section, entitled "General Objectives of the Course," is a statement of the instructor's aims in his own terms, not necessarily related to our frame of reference. There follow three other sections entitled "The Knowledge Objective," "The Skill Objective," and "The Attitude Objective." Within each of the latter three we discuss, first, the details of the objective in question; for instance, if there is a knowledge objective, we would describe it in outline form. Then, secondly, we discuss the instruction methods involved.

These reports of interviews with professors, at the course level, which vary from 3 to 10 pages in length, form the real basis for our project.

There are, however, certain more general questions which we ask deans, or those who speak for the school as a whole. These are considered a "by-product" of the study, and are relatively unimportant in my view of the total effort. In fact, I have been a little embarrassed at times for fear that the deans will judge our project solely on the basis of the questions we ask them.

#### V. THE OPINION OF DEANS REGARDING THE FIELD OF ADMINISTRATION

It would be interesting if we could get a detailed opinion from deans of schools as to the objectives of courses in administration. To do this would be beyond our resources, and, I am afraid, beyond the patience of the deans -- since they would in effect be asked to summarize the objectives of all courses in the group at a detail level corresponding to the questions we ask professors.

We do, however, feel that it is of value to put these questions to those who speak for schools:

- 1) If your school offers courses in administration, why were they installed -- or why do they exist in the curriculum (this usually leads to the question, "Is there a field of administration and if so, what is it"?)
- 2) Why do you believe that the objectives are approached in separate courses, rather than achieved in functionally or institutionally orientated courses?

The reaction of deans to these questions has been gratifying. And the fact that many deans are not "management teachers by trade" gives us an insight into the nature of the field of administration that we might not otherwise have. For example, former Dean Garfield Cox at the University of Chicago, whose field is finance, has given us a rather clear idea as to why such courses are offered at Chicago. The same might be said for Dean Culliton at Notre Dame, whose field is marketing; Acting Dean Westfall of Oklahoma, whose field is accounting; or Dean Jacoby of U.C.L.A., whose field is economics.

We have also sought the advice of certain professors who teach functionally oriented courses in administration, in order that we do not overlook some of the implications here. Professor Gilmore of Cornell, Professor Goetz at MIT, and Professor Holden at Stanford are examples. The project is not, however, a curriculum study, and even though there is strong feeling on the part of many that the entire curriculum teaches management, we must select our area of study on the basis of time and resources at hand.

## VI. THE USE OF THE FINDINGS

Finally, I would like to say a word about what we expect to do in the way of reporting the final results. The tentative date for completion of the report is August 1st of this year. The Bronfman Foundation will probably provide for printing a summary of the findings, to be made available to those interested. The appendices, including all detailed interview reports, will amount to some 600 or 700 pages. It is our present thinking that these will not be reproduced in quantity because there would be only a small number who would be interested in studying them, and because the cost of publishing that volume of material would be excessive. We hope, however, to make these available at least to the participating universities in some form.



## AGENDA FOR BUSINESS MEETING, ACADEMY OF MANAGEMENT

Columbia University, New York City - December 29, 1955  
Journalism Building, Southeast corner Broadway and 116th

1. Announcement of officers for 1956
2. Report of the Secretary-Treasurer
3. Report of committee chairman
  - A. Finance
  - B. Membership
  - C. Program
  - D. Research and Publications
4. Report of representative to Council on Professional Education
5. Question of place of meeting for 1956
  - A. Should the 1956 meeting be coincidental with that of the American Economic Association
  - B. If we are to move with A.E.A., should we plan to continue sharing the common program?
  - C. If it is not desired to meet coincidental with A.E.A., should we meet elsewhere at the Christmas holidays or at some other time during the year?
6. Question of length of meeting of 1956.
7. Consideration of any changes in Constitution or By-Laws which may be proposed
8. Designation of Nominating Committee to propose slate for and conduct election for 1957
9. Announcement as to when new standing committee chairmen and members may expect appointment
10. Any other business
11. Vote of thanks as may be appropriate



## ACADEMY OF MANAGEMENT

## Minutes -- 1955

President Ronald Shuman of Oklahoma called the Business Meeting to order at 4:15 p.m.

The Nominating Committee (Professor William H. Newman of Columbia, Chairman) reported that a count of mail ballots showed election of the following to national office for 1956:

President	- Franklin Moore of Michigan
Vice President	- Alvin Brown of Johns Manville
Secretary-Treasurer	- Billy Goetz of Massachusetts Institute of Technology

The Treasurer's report was circulated before the meeting and was approved as circulated. A copy is included in these Proceedings.

Finance Chairman Alvin Brown recommended that our fiscal year for the future end on November 30. The purpose of this recommendation was to insure that a complete Treasurer's report would be available at the Annual Business Meeting. The Finance Committee report also recommended that \$1,000 of the Academy funds be invested to produce a return (\$1,000 of the funds of the Academy was deposited in the Warren Institution for Savings on February 23, 1956). A copy of the Finance report is appended to these minutes.

Professor Joseph Towle of Washington University, Membership Chairman, reported that membership has increased from 40 in December, 1953, to 110 in December, 1954, and to 157 in December, 1955. Professor Towle suggested placement of a discussion of size and quality of membership on the agenda for the 1956 Annual Meeting.

Program Chairman Franklin Moore of Michigan stated that he would let the program speak for itself. He expressed thanks to his committee members for their effort and special appreciation to Professor William H. Newman of Columbia for his help in handling local arrangements.

Professor M. J. Mandeville of Illinois, Chairman for the Research and Publications Committee, reported continuing study of the question of publication of a journal. It was the recommendation of his Committee that specific action to initiate publication of a journal be postponed but that the Committee continue study of the matter. Professor Mandeville's report is appended to these minutes.

Professor John F. Mee of Indiana, Representative to the Council on Professional Education briefly reported on the recently held meeting of that Council. Professor Mee succeeded to the Presidency of the Council following Professor Miller.

Arrangements for the 1956 meeting were discussed but no final decision arrived at. Professor Jamison proposed that a questionnaire be circulated to determine whether our membership would prefer to meet concurrently with the American Accounting Association in September instead of with the American Economic Association in December. It was decided that such a questionnaire would be mailed with copies of these Proceedings.

Various proposals relating to changes in the Constitution and By-Laws were referred to the 1956 Executive Committee for further consideration and presentation to the membership by mail or at the next Annual Business Meeting. (A preliminary draft of a revision of the Constitution and By-Laws had been prepared by the present Executive Committee but the time factor had not permitted its presentation to the membership for due consideration). The 1956 Executive Committee is to make recommendations, among other things, concerning: (a) our present practice of dropping members after two years non-payment of dues; (b) the possibility of making provision for members emeriti.

President-elect Franklin Moore took no action at the Business Meeting with respect to appointment of committees for 1956.

A suggestion was made but not voted on that our Annual Business Meeting be immediately following lunch instead of continuing the present practice of concluding the session with the Business Meeting.

On a motion of Professor William H. Newman the 1955 authorization to the Executive Committee to disburse from the Treasury a sum not to exceed \$100.00 to help promote a West Coast section meeting, if an adequately supported request from that area was received, was continued for another year.

The Business Meeting concluded with voting of resolutions of appreciation to Columbia University as host to the 1955 meeting, to Professor William H. Newman, to Ed Curcuru and to Miss Camilla Koch for their invaluable assistance with respect to local arrangements. A vote of thanks was also made to the program Committee for assembling an excellent group of speakers and topics for the 1955 program.

President Shuman expressed his appreciation to the members of the Executive Committee and all committee chairmen and members for their contribution to the growth and success of the Academy during the year just terminated.

The Business Meeting adjourned at 5:30 p.m., December 29, 1955.

Respectfully submitted.

Billy E. Goetz  
Secretary-Treasurer

Report of Finance Committee  
December 29, 1955

Your Committee has examined the report of the Treasurer for the period December 28, 1954, to December 23, 1955, and finds it to be correct.

Total receipts (dues): \$ 780.00

Disbursements	301.15
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Your Committee has inspected the vouchers related to these expenditures and believes the expenditures were properly made. An itemized statement thereof is available to members.

Excess of receipts over disbursements \$478.85

Cash on hand, December 28, 1954	1092.70
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Cash on hand, December 23, 1955	1571.55
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Your Committee verified the cash on hand at \$1571.55 by inspection of the bank statement.

## Recommendations

1. In order to facilitate examination by the Finance Committee, your Committee recommends that hereafter the Treasurer be request to account as at November 30 for the preceding 12 months.

2. Your Committee recommends that the Treasurer be requested to place \$1000.00 of the Academy's funds, or more at his discretion, at interest in a savings bank.

3. Your Committee recommends that the Academy extend its thanks to Professor Billy E. Goetz for consenting to perform the somewhat irksome duties of Treasurer.

Alvin Brown

ACADEMY OF MANAGEMENTRECEIPTS AND DISBURSEMENTS

Balance December 27, 1954	\$1,092.70
1954 Dues paid in 1955	115.00
1955 Dues paid in 1955	655.00
1956 Dues paid in 1955	10.00
<b>Total</b>	<b>\$1,872.70</b>

Disbursements

Guest lunches 1954 meeting	\$ 5.50
Engg. Society - Fellows Dinner	5.25
Application blanks and letters	30.20
Rental of Junior Room U of M	25.00
Letterheads	23.00
Annual Proceedings	194.20
Surety Bond	5.00
Postage	13.00

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 301.15

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 \$1,571.55
 

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BALANCE SHEET

December 23, 1955

Cash (as above)	<sup>1</sup>	\$1,571.55
1954 Dues Receivable (5 members)	<sup>2</sup>	25.00
1955 Dues Receivable (32 members )		160.00
<b>Total Assets</b>		<b>\$1,756.55</b>

- 1 two of whom have paid 1955 dues  
 2 17 joined Academy since Nov. 1, 1955

Paid 1955 dues	131
1955 dues not paid	32
<b>Total members</b>	<b>163</b>

### Report of the Research and Publications Committee

The Committee on Research and Publications held exploratory discussions during the year in an effort to determine proper activities in which the Academy might engage and the place of the committee in furthering them. The thinking centered about three types of Academy publications and related research projects. The publications considered were:

1. A Journal of Management.
2. Monographs written by Academy members.
3. Proceedings of the Annual Meeting.

The publication of a quarterly magazine to contain articles primarily on the theory and philosophy of management appealed to most members of the committee, and inquiries were made among other professional associations on the problems and costs of such a publication. It was found that an academic journal of this nature takes considerable planning and involves a financial burden beyond the resources of the Academy at this time. To lighten the cost there is the possibility of securing a subsidy from advertisements or even a more direct sponsorship by some of the large corporations of the country. However, the financial burden still remains a problem, as the experience of the older and much larger American Marketing Association has proved. After several years of publication The Journal of Marketing has only recently been able to approximate a break-even point.

It is the recommendation of the Committee that despite the financial difficulty involved the Academy consider seriously the publication of a journal within the next few years. While there are several excellent magazines devoted to different phases of management at the present time, it is the belief of the committee that there is still a need for a purely academic journal appealing to the special interests of members of the Academy of Management.

In the early days of the Academy a few monographs were published under sponsorship of the Academy but at the expense of some university. It is the recommendation of the Committee that the Academy renew this practice and encourage members to submit suitable monographs to its Research and Publications Committee for possible publication. At the present time it is believed the financing of printing and distribution should still be borne by some university willing to assume this expense rather than the Academy, but that any monographs so published will be clearly marked as coming from the Academy of Management as well as the individual author.

The Proceedings of the Annual Meeting have in the past been edited by the Secretary-Treasurer rather than our committee. The question was raised as to whether this task should be allocated to the Research and Publications Committee and thus put all publications of the Academy under its jurisdiction.



On account of the nature of the Proceedings and the problem of mailing to the members, the Committee wishes to recommend that the Proceedings of the Annual Meeting continue to be edited and prepared for mailing by the Secretary-Treasurer and that he should have sole jurisdiction over their publication.

During the year, Professor William H. Newman proposed that the Academy sponsor a research project on the content of management courses currently being offered in some twenty-three colleges or universities throughout the country. Approval for financing had been secured from the Bronfman Foundation and Mr. Charles Summer of Columbia University was selected to conduct the research. Our Committee gave unanimous approval to this project since it was considered a much needed and worthwhile study and of especial interest to members of the Academy. The study began during the summer of 1955 and is expected to be finished about August 1, 1956. A preliminary report on the findings will be given by Mr. Summer at this meeting.

Submitted at the annual meeting of the Academy on December 29, 1955.

Keith Davis  
C. S. George  
Dalton E. McFarland  
Richard W. Owens  
M. J. Mandeville, Chairman

ACADEMY OF MANAGEMENTCONSTITUTION

No amendments were enacted during 1955. The Constitution of the Academy of Management was included in the 1954 Proceedings, of which every member of the Academy has received a copy. New members will also receive copies of the 1954 Proceedings. Consequently, it seems an unnecessary expense to reproduce the Constitution in this 1955 Proceedings.





